

Computerized Physician Order Entry: A Prescription for Patient Safety

- As one of its three key patient safety initiatives, the LeapFrog Group advocates the use of a computerized physician order entry/clinical decision support (CPOE/CDS) system.
- Clinician adoption of CPOE/CDS solutions is crucial to helping caregivers reduce medical errors and enhance patient safety.

WITH ORGANIZATIONS LIKE the LeapFrog Group highlighting the need for safer, more cost-effective care in the U.S. health care system, it's no surprise that addressing patient safety concerns has emerged as a top priority for health care organizations nationwide. In fact, it would be difficult to find a health care executive who is not tackling this critical issue, and many are turning to information technology and automation for help. As one of its three key patient safety initiatives, the LeapFrog Group advocates the use of a computerized physician order entry/clinical decision support (CPOE/CDS) system for helping organizations improve quality and help control costs.

A CPOE/CDS system guides physicians in making care decisions that result in the best treatment for patients. CPOE/CDS indirectly benefits the rest of the care team, including the nursing staff, by producing legible, complete orders that have already been checked for any medication contraindications, dosing errors, duplicates, or potential conflicts with specific patient data. The result is that nurses spend less time following up on incomplete, illegible, or conflicting patient orders.

Other quality and patient safety benefits of CPOE/CDS come from the effect such systems have on the physician's decision-making process about what therapies to order for patients. CPOE/CDS can provide access to current patient information, best practices, and disease-specific, evidence-based order sets that help to optimize treatment planning and resource use. This information is presented to the physician or other clinician at the time of clinical decision making, before the order has been finalized and entered into the clinical information system.

The LeapFrog Group, a consortium of more than 90 *Fortune 500* companies and other large public and pri-

vate health care sector purchasers, identified three patient safety measures as the initial focus for improving safety and reducing medical errors. One of these three measures is the use of CPOE in hospitals to prevent prescribing errors. CPOE can reduce prescribing errors in hospitals by more than 50% (LeapFrog Group for Patient Safety, 2001). In addition, it benefits the entire care team by producing clearer and more complete orders, thus eliminating the need for interpretation or followup by care team members.

In fact, the LeapFrog Group's recent report, "Computerized Physician Order Entry: A Look at the Vendor Marketplace and Getting Started," is a welcome resource for both health care providers and vendors who want to enhance patient safety and reduce medical errors. In the report, Metzger and Turisco (2001) from the First Consulting Group lay out easy-to-understand steps for formulating a plan that follows LeapFrog Group's computer physician order entry and clinical decision support standards, as well as evaluating and choosing a vendor to provide the necessary infrastructure and software.

A recent Gartner Group survey of care delivery organizations (CDOs) found that 88% of the CDOs that currently do not have CPOE plan to implement a solution within the next 2 to 3 years (Hieb & Handler, 2001). However, within the few hospitals that have CPOE solutions, only a small proportion of physicians are active users. Since error reduction is a key motivator behind CPOE implementation, successful solutions must include both functionality that helps caregivers reduce errors and acceptance rates that can deliver the benefits associated with CPOE/CDS.

Because of the predicted growth in CPOE use, it is important for nurse leaders to understand the issues surrounding adoption and how to evaluate potential solutions to ensure successful implementation.

The LeapFrog Group report identified nine clinical decision support categories that can be used to evaluate the functionality of any CPOE/CDS solution, as well as how each of these categories contribute to patient safety (see Table 1). These categories represent a continuum of increasing sophistication ranging from basic field edits that might check for appropriate text/numeric data field entry to rules-based surveillance with alerts outside order entry that might check orders against real-time results. For example:

- By implementing basic field edits such as required

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Table 1.
Category of Clinical Decision Support and Description

Category of Clinical Decision Support	Description	Contribution to Patient Safety
Basic field edits	Setting of basic parameters for field content (e.g., text vs. numeric)	Reduced errors.
Structured orders	Templates for each ordered service	Reduced errors. More complete orders.
Groups of predefined orders	Predefined grouping of orders that can be selected as a starting point for patient-specific orders	Reduced errors. Less variability of care.
Order checking (with or without a reference database)	Checking of medication orders for drug interactions and contraindications	Reduced errors. Improved quality. Less duplicate interventions.
Complex orders with specialized tools	Templates and tools used for dose calculations	Reduced errors. Better dosing calculations.
Order-relevant patient data display	Automatic display of patient information	Review of patient information influences choice, timing, or dose of medication.
Order-relevant patient data capture	Prompting for patient-specific information not included in orders but needed to screen intervention for possible contraindication	Expanded availability of relevant patient information to aid in decision support. Better use of targeted interventions.
Rules-based prompting and alerts within order entry	Real-time prompting and alerting at the time of order entry	Reduced errors.
Rules-based surveillance with alerts outside of order entry	Prompting and alerts to reconsider ordered interventions based upon new information such as returned lab results	Reduced delays in re-evaluating patient's orders.

fields, default values, allowable values and predefined selection lists, the system guides the clinician in entering the order information accurately and completely.

- Using already known patient data such as weight, allergies, age, laboratory results, and other order information, the system can alert the clinician to any possible conflicts or potential errors when the order is being placed.
- Using a rules engine, alerts and reminders can be generated in real time, prompting clinicians to re-evaluate their patient management strategy.

In addition to strict functionality, the LeapFrog Group report identified several other areas of focus for CPOE/CDS purchasers should focus, including:

- Processes and clinician workflow
- Implementation
- Technology

- Cost
- Risk
- Implementation planning

Ease of use and fit with clinician workflow are related and tied tightly to the success of automating the physician order entry process. To gain acceptance, solutions must be, at a minimum, time neutral when it comes to entering orders, searching for results, communicating with peers, and obtaining access to clinical knowledge.

CPOE workflow must address the needs of all clinicians, including nursing staff, since physicians are not the only ones who typically place orders. Solutions also must be flexible enough to respond to the changing workflow of clinicians as the care setting changes (for example, hospital, clinic, office, home). This permits clinicians to leverage skills obtained using the solution in one setting and apply them to other settings to achieve a greater benefit.

CPOE is not a stand-alone patient safety solution. It

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should be integrated with other clinical applications, knowledge bases, and data repositories. For example, automated medication administration systems using bar coding scanning techniques automate the "five rights" of medication administration, preventing adverse drug events (ADEs) at a critical point — the last step before the patient receives the medication. At the same time, it produces an electronic medication administration record and captures any errors and/or near-miss data that can be used for reporting and analysis.

Choosing the right CPOE/CDS vendor should not be limited to solely evaluating the software but ensuring that the vendor has a well-defined implementation methodology. It is important to have both nursing as well as physician champions to lead the implementation effort. An identical implementation approach is necessary since the solution will be used by physicians and nurses alike, thus affecting each caregiver's daily actions through a change in workflow and the method in which orders are entered. The implementation component is a critical step in the success of CPOE/CDS adoption by all members of the care team.

Clinician adoption of CPOE/CDS solutions is crucial to helping caregivers reduce medical errors and enhance patient safety. The LeapFrog Group CPOE/CDS report can be a helpful guide, but as clinicians concerned about the quality of health care and the well-being of our patients, we must play an active role in the successful adoption of these solutions by:

1. Making sure that your institution is committed to having the appropriate people involved in the entire process, including nurse leaders.
2. Selecting a vendor that has the knowledge and clearly understands the importance of implementing this type of system.
3. Ensuring that your organization is selecting a system that actually meets the criteria defined by the LeapFrog Group.⁵

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